

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Air Permits Program

TECHNICAL ANALYSIS REPORT
for
Air Quality Control Minor Permit No. AQ0264MSS03

US Air Force
Eielson Air Force Base

MODIFICATIONS TO PORTABLE ASPHALT/ROCK CRUSHER

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Final – June 6, 2008

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Abbreviations/Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AQC	Air Quality Control
AS	Alaska Statutes
ASTM	American Society of Testing and Materials
EAFB	Eielson Air Force Base
EPA	U.S. Environmental Protection Agency
MR&R	Monitoring, Recordkeeping, and Reporting
N/A	Not Applicable
NSPS	New Source Performance Standards
ORL	Owner Requested Limit
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
TAR	Technical Analysis Report
USAF	United States Air Force

Units and Measures

gr./dscf	grains per dry standard cubic feet (1 pound = 7,000 grains)
dscf	dry standard cubic foot
hp	horsepower
kW	kiloWatts (electric)
lbs	pounds
MMBtu	million British thermal units
ppm	parts per million
ppmv	parts per million by volume
tpy	tons per year
wt%	weight percent

Pollutants

CO	Carbon Monoxide
NO _x	Oxides of Nitrogen
PM	Particulate Matter
PM-10	Particulate Matter with an aerodynamic diameter less than 10 microns
S	Sulfur
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound

1. Introduction

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (the department's) basis for issuing Air Quality Control (AQC) Minor Permit No. AQ0264MSS03 to the United States Air Force (USAF) for a project at Eielson Air Force Base (EAFB). The USAF's minor permit application is dated November 2007; however the department did not receive payment until January 8, 2008. The USAF submitted supplemental information on February 29, 2008, March 6, 2008 May 29, 2008, and June 2, 2008. USAF is planning to add a jaw crusher to the recently installed portable asphalt/rock crusher at EAFB.

Except for the changes listed in this TAR, Permit No. AQ0264MSS03 includes all of the provisions of Permit No. AQ0264MSS01, the bases of which are described in the attached TAR for Permit No. AQ0264MSS01.

2. Background

2.1 Application Description

USAF was recently issued permit No. AQ0264MSS01 to install a portable asphalt/rock crushing plant to recycle pavement that has been stockpiled from various asphalt demolition projects that have occurred at EAFB. Please see the TAR for Permit No. AQ0264MSS01 (attached in Appendix B) that describes the asphalt/rock as originally permitted.

In the application for AQ0264MSS03, Eielson AFB requested to modify this asphalt/rock crushing plant to add a jaw crusher for crushing larger sized material and a 450 hp engine in addition to the already permitted asphalt/rock crusher.

The revised emission unit inventory is shown in Table 1 of Minor Permit No. AQ0264MSS03.

USAF requested a 4,000 hour limit for the new jaw crusher engine (Unit 84) and requested to replace the ORL of 2,184,000 hp-hrs/yr with 4,000 hrs/yr for the existing asphalt/rock crusher engines (Units 75 and 76). The 2,184,000 hp-hrs/yr limit was established in Permit No. AQ0264MSS01 to avoid Prevention of Significant Deterioration (PSD) for nitrogen oxides (NO_x).

The departments' findings regarding the application are listed in Section 3.

2.2 Project Emissions Summary

In their application and supplemental information submitted through June 2, 2008 the USAF provided emission calculations for jaw crusher transfer points (Units 77-83) and the new engine (Unit 84).

The USAF used the following assumptions in their emission calculations.

- (1) **Units 77 through 83** are fugitive dust sources.¹ The department does not count fugitives as part of potential to emit (PTE); therefore they do not contribute to applicability

¹ As defined in 40 C.F.R. 51.166(b), *Fugitive Emissions* means "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." In a February 10, 1999 EPA Guidance, EPA states: "where emissions are not actually collected at a particular site, the question of whether the emissions are fugitive or non-fugitive should be based on a factual, case-by-case determination made by the permitting authority".

determinations. Under 18 AAC 50.502(c)(3)(A). (The department does count fugitives under 18 AAC 50.502(c)(3)(B) and (e)(2)). Fugitive emissions are included when calculating assessable emission fees. The USAF did not specifically state that “wet suppression” methods will be used to control particulate matter less than 10 micro meters PM-10, but since they used “controlled” emission factors from AP-42, Table 11-19.2-2 to calculate PM emissions, the department will require controls for PM.

- (2) For the new jaw crusher engine (**Unit 84**), USAF used vendor emission rates for John Deere Model 6125H at full load operations for NO_x, carbon monoxide (CO), PM-10, and volatile organic compounds and ORL of 4,000 hours. SO₂ emissions for Unit 84 were calculated using mass balance and fuel sulfur content of 0.5 percent by weight.
- (3) For the revised ORL for existing engines Unit 75 and 76, USAF calculated emissions assuming 4,000 hours per year, each. For Unit 75, USAF used vendor data for NO_x, CO, PM-10, and VOC. For Unit 76, USAF used AP-42 for NO_x, CO, PM-10, and VOC. For Units 75 and 76, USAF calculated SO₂ emissions using mass balance and assuming a fuel sulfur content of 0.5 percent by weight.
- (4) Emission calculation assumptions for the existing ORL (established in Permit No. AQ0264MSS01), are provided in the TAR for that permit, which is attached to this TAR as Appendix B.

Emission estimates are shown in Table 1.

Table 1 –Emission Estimates

Unit No.	Description	Potential Emissions in tpy				
		NO _x	CO	PM-10	VOC	SO ₂
Jaw Crusher						
77	Jaw Crusher Dump Point	N/A ^a	N/A	0.0	N/A	N/A
78	Transfer Point (Jaw Crusher Screen to Superior Conveyor #1)	N/A	N/A	0.0	N/A	N/A
79	Transfer Point (Conveyor #1 to Superior Conveyor #2)	N/A	N/A	0.0	N/A	N/A
80	Transfer Point (Conveyor #2 discharge onto Asphalt Stockpile)	N/A	N/A	0.0	N/A	N/A
81	Jaw Crusher	N/A	N/A	0.0	N/A	N/A
82	Transfer Point (Jaw Crusher to Recycling Plant Fed Conveyor)	N/A	N/A	0.0	N/A	N/A
83	Transfer Point (Jaw Crusher to Cobra Recycling Plant)	N/A	N/A	0.0	N/A	N/A
84	Jaw Crusher Engine	8.4	1.7	0.2	2.2	3.2
Total for Jaw Crusher		8.4	1.7	0.2	0.2	3.2
Units 75 and 76						
ORL from Permit No. AQ0264MSS01 ^b		33.9	7.3	2.4	2.7	4.0
New ORL of 4,000 hours for Units 75 and 76		14.6	3.0	0.7	2.7	4.0
Difference between previous ORL and new ORL for Units 75 and 76		(19.3)	(4.3)	(1.7)	0.0	0
Unit 63						
Removal of Unit 62 and 63 ^b		0	0	(0.4)	0	0
Emission Change due to Permit No. AQ0264MSS03		(10.9)	(0.9)	(1.9)	0.2	(3.1)
Minor Permit Applicability Threshold		10	N/A	10	N/A	10
Minor Permit Required?		No	No	No	No	No

^a N/A means "Not Applicable"

^b From TAR for Permit No. AQ0264MSS01 dated February 14, 2007, Table 1 (See Appendix B).

As shown in **Table 1**, this project causes a reduction in stationary source potential to emit.

Table 2 shows the assessable emissions listed in Permit No. AQ0264MSS01 issued on February 14, 2007 and the **change in** assessable emissions from this minor permit.

Table 2 –Assessable Emissions

Pollutant	Assessable Emissions in Permit No. AQ0264MSS01 (tpy)	Change in Assessable Emissions due to Permit No. AQ0264MSS03 (tpy)	New Assessable Emissions (tpy)
NO _x	1,751	(11)	1740
CO	762 ^b	(4)	758
PM-10 ^a	459	(2)	457
VOC	98	0	98
SO ₂	1,023	0	1023
		Total	4076

^a Assessable PM-10 emissions include fugitive sources

^b There was an error in CO emissions in Table 2 of permit AQ0264MSS01. The 962 tpy in Table 2 should have read 762 tpy.

3. Department Findings

Based on a review of the application, the department finds that:

- (1) EAFB is classified as a PSD major stationary source for the following pollutants: NO_x, SO₂, PM-10, and CO.
- (2) The USAF has requested authorization to add a jaw crusher to the recently permitted asphalt/rock crusher at EAFB.
- (3) The applicant requested an ORL for the new jaw crusher engine (Unit 84) to avoid the need for a minor permit under 18 AAC 50.502(c)(3). Therefore, this permit action is classified as needing a permit under 18 AAC 50.508(5).
- (4) This permit action is classified as needing a permit under **18 AAC 50.508(6)** to replace the 2,184,000 hp-hrs/yr limit established in Permit AQ0264MSS01 with 4,000 hrs/yr for Units 75 and 76. As shown in **Table 1**, the revised ORL maintains the PSD avoidance threshold of 40 tpy for Permit No. AQ0264MSS01.
- (5) The addition of the jaw crusher in this permit action is considered as a project scope change to the original portable asphalt/rock crusher for PSD purposes. In other words, the asphalt/rock crusher permitted in AQ0264MSS01 and the jaw crusher are not independent projects for PSD applicability. Therefore, the combined emissions from the existing and proposed units are evaluated for PSD. As shown in **Table 1**, because of the revised ORL and new data for Unit 75, the total emissions from the rock crusher and jaw crusher in Permit AQ0264MSS03 together are lower than the total emissions from just the rock crusher authorized in Permit No. AQ0264MSS01. Therefore, classification as PSD major modification is avoided.
- (6) Under 18 AAC 50.540(k)(3), an application for a permit classified under 18 AAC 50.508(6) must include the effect of the change on “other permit terms”. USAF conducted modeling to show that the addition of the jaw crusher to the existing rock

crusher would not cause a violation of the PM-10 increment.² See modeling memorandum in Appendix A.

- (7) This application is also classified under 18 AAC 50.502(b)(3) for operation of a rock crusher. Under 18 AAC 50.540(c)(2)(D), the department has the discretion to request an ambient analysis for a permit classified under 18 AAC 50.502(b). As described in item (6) USAF provided an ambient demonstration to satisfy the requirements for a permit under 18 AAC 50.508(6). Therefore, the department did not have to make a finding to require a demonstration under 18 AAC 50.540(c)(2)(D).
- (8) The proposed diesel engine and the fugitive transfer points for the jaw crusher are subject to state emissions standards in 18 AAC 50.055(a) (1) for visible emissions, 18 AAC 50.055(b)(1) for PM emissions, and 18 AAC 50.055(c) for SO₂ emissions, for industrial processes and fuel burning equipment.
- (9) The department has treated the jaw crusher engines as stationary engines because the unit will be in one location for more than 12 months.
- (10) EAFB is not in a coastal district, so no Alaska Coastal Management Program coordination is required for this project.
- (11) The USAF's application and subsequent submittals for a minor permit contain the elements listed in 18 AAC 50.540.

4. Permit Requirements

State regulations in 18 AAC 50.544 describe the elements that the department must include in minor permits. This section of the TAR provides the technical and regulatory basis for the permit requirements in Minor Permit No. AQ0264MSS03, which is classified under **18 AAC 50.502(b)(3) and 18 AAC 50.508(6)**.

4.1 General Requirements for all Minor Permits

This permit includes the following requirements necessary for all minor permits as described in 18 AAC 50.544(a)(1) through (4):

- (1) The cover page identifies the stationary source, the project, the permittee, and contact information.
- (2) The department includes emission fee requirements in minor permits if the minor permit changes assessable emissions. New assessable emissions are shown in

² EAFB is a stationary source with other increment consuming emission units (besides the rock crusher). The Department has already made a finding under 18 AAC 50.201(b) through the GP9 permit that uncontrolled rock crushers may cause increment violations. The location restriction in GP9 do not necessarily protect increment at stationary sources with other increment consuming emission units.

Table 2 of this TAR.

The contents of a minor permit (18 AAC 50.544(i)) issued under 18 AAC 50.508(6) and 18 AAC 50.508(5) need not include performance tests to comply with state emissions standards of 18 AAC 50.055 for industrial processes and fuel burning equipment. Therefore, no initial compliance demonstration for Title 1 purposes is required for Units 77-83 (industrial processes) and engine Unit 84 (fuel burning equipment).

4.2 State Emission Standards for Asphalt/Rock Crushers

Visible Emissions –Because the jaw crusher has the potential to violate the visible emissions standard, the department included the jaw crusher in the on-going periodic visible emissions observations requirements for the existing Asphalt/Rock Crusher fugitive emission units.

Particulate Matter - Because it is not possible to perform Method 5 when the emissions are not emitted from a stack, vent, or duct, no PM monitoring is required.

Sulfur Dioxide – The transfer points of the asphalt/rock crusher do not emit SO₂, so there is no need for the department to include on-going monitoring, recordkeeping, and reporting (MR&R) in the permit.

The bases for the state emission standards for previously permitted asphalt/rock crusher equipment are discussed in the TAR for AQ0264MSS01 (attached).

4.3 State Emission Standards for Diesel Engines

Visible Emissions The visible emission condition also contains on-going MR&R as described in the standard condition for liquid fuel-fired emission units.

Particulate Matter - The application included a PM compliance demonstrations for jaw crusher engine, Units 84 using 40 CFR 60 Appendix A, Method 19 calculations. The calculations used vendor guaranteed emission rate of 0.111 g/hp-hr representative of maximum load and rated speed (330 kilowatts at 1,800 revolutions per minute) for PM. Periodic MR&R for the unit is based on the standard condition for liquid fuel-fired emission units.

Sulfur Dioxide – an engine has the potential to exceed the SO₂ standard, so the department added the jaw crusher engine to the periodic monitoring requirements already established for the previously permitted engines. As described in the TAR for Permit No. AQ0264MSS01, compliance with the state sulfur standard is based on the standard condition for liquid fuel-fired emission units.

4.4 Limit to Avoid Minor Permitting Requirements for NO_x

The permit contains an ORL of 4,000 hrs/yr for Unit 84, to avoid the need for a minor permit for NO_x. The NO_x emissions for Unit 84, is based on vendor guaranteed emissions data of 4.22 g/hp-hr . With this limit, the increase in the NO_x PTE is 8.37 tpy, and below the 10 tpy threshold for a minor permit.

4.5 Limit to Avoid PSD for NO_x

The permit contains an ORL of 4,000 hrs/yr for Units 75 and 76, to avoid PSD for NO_x. The NO_x emissions for Unit 76 is based on AP-42, Table 3.3-1 emission factor of 0.031 lb/hp-hr. The

NO_x emissions for Unit 75, is based on vendor data emission factor of 4.22 g/hp-hr. With this revised limit and the NO_x from Unit 84, the PTE for the rock/asphalt crusher and jaw crusher project is 22.95 tpy, and below the 40 tpy threshold for PSD.

4.6 Ambient Air Quality Protection Requirements

As required under 18 AAC 50.540(k)(3), a permit application under 18 AAC 50.508(6) must include the effects of revising permit terms and condition. USAF submitted a 24 hour increment analysis for PM-10. The department's review of the modeling demonstration is included in Appendix A. Because the USAF used AP-42 "controlled" based on "wet suppression" emission factors from Table 11.19.2-2 to demonstrate compliance with the increment standards, the department is requiring that USAF use wet suppression for the jaw crusher transfer points identified as Units 77 through 83 in Table 1 of Permit AQ0264MSS03. These new units were added to the existing units for PM-10 monitoring.

4.7 Maintenance Requirements

As described in 18 AAC 50.544(b)(2), the permit must include maintenance of equipment according to the manufacturer's or operator's maintenance procedures, keep records, and keep a copy of the maintenance procedures.

4.8 Fugitive Dust, Dust Control Plan, and Air Pollution Prohibited

This section includes fugitive dust, dust control plan, and air pollution prohibited requirements from GP9. These requirements are necessary to ensure that the project complies with the requirements of AS 46.14 and 18 AAC 50, as described in 18 AAC 50.544(b)(1).

4.9 Recordkeeping, Reporting, and Certification Requirements

All air quality control permits must contain procedures for recordkeeping, reporting, and certification, including the requirements described in 18 AAC 50.345(h). Information request requirements are specifically required under 18 AAC 50.200. Certification requirements are specifically required under 18 AAC 50.205. Recordkeeping and reporting requirements are also required under 18 AAC 50.544(b)(1)(D) and (E), respectively.

4.10 Terms to Make Permit Enforceable

The minor permit contains these requirements to ensure that the permittee will construct and operate the stationary source or modification in accordance with 18 AAC 50, as described in 18 AAC 50.544(i).

5. Permit Administration

The department considers the addition of the Rock Crusher as authorized in the minor permit to be an *off-permit change* for the purposes of Title V permitting. *Off-permit changes* are defined in 40 C.F.R. 71.6(a)(12) as

"...changes that are not addressed or prohibited by the permit other than those subject to the requirements of 40 C.F.R. parts 72 through 78 or those that are modifications under any provision of title I of the Act..."

Therefore, the USAF may operate in accordance with Minor Permit No. AQ0264MSS03 upon issuance.

Appendix A : Modeling Review Memorandum

MEMORANDUM

State of Alaska
Department of Environmental Conservation
Division of Air Quality

TO: File	DATE: April 17, 2008
THRU:	FILE NO.: AQ0264MSS03
	PHONE: 269-7577
	FAX: 269-7508
FROM: Patrick Dunn Environmental Engineer Assistant Air Permits Program	SUBJECT: Review of USAF EAFB Ambient Assessment

This memorandum summarizes the Department's findings regarding the revised ambient assessment submitted by the United States Air Force (USAF) for the "Revisions to Portable Asphalt Rock Crusher Project" at Eielson Air Force Base (EAFB). The USAF submitted the revised assessment in support of a November 27, 2007 minor permit application to add a jaw crusher to the portable asphalt rock crusher permitted in Minor Permit No. AQ00264MSS01. As described in this memorandum, the USAF's analysis adequately shows that revising their emission units will not cause or contribute to a violation of the maximum allowable increases (increments) listed in 18 AAC 50.020.

The Department previously approved the ambient demonstration that the USAF submitted in support of the AQ0264MSS01 permit application. The Department's original findings are documented in the December 4, 2006 memorandum, "Review of Ambient Assessment." Today's memorandum only addresses those items that have changed subsequent to the December 4, 2006 memorandum.

BACKGROUND/COMMENTS

The Hoefler Consulting Group (Hoefler) (on behalf of the USAF) submitted the original ambient assessment on October 6, 2006. The USAF submitted a revised ambient assessment on October 30, 2006. The USAF showed compliance with the 24 hour increment for particulate matter less than 10 microns in diameter (PM-10). The USAF assumed emission factors with wet suppression methods and Minor Permit No. AQ0264MSS01 contains an ambient condition requiring wet suppression methods be applied to the portable asphalt rock crusher emission units. This ambient condition needs to be revised to include the jaw crusher emission units.

The USAF's application triggers minor permit review under 18 AAC 50.508(6). Per 18 AAC 50.540(k)(3), applicants subject to 18 AAC 50.508(6) must include in their application the effects of revising permit terms and conditions. Therefore, the USAF provided a 24 hour increment ambient analysis for PM-10 under 18 AAC 50.540(k)(3).

EMISSION RATES, VOLUME SOURCES AND STACK PARAMETERS

The USAF used the AP-42 emission factors assuming wet suppression for the PM-10 emissions from the crushing and grinding circuit of the jaw crusher. These emission factors are significantly lower than the emission factors which do not assume wet suppression. Therefore, the Department will require wet suppression methods for the crushing and grinding circuit to ensure compliance with the PM-10 increment.

The USAF modeled the emissions from the crushing and grinding circuit of the jaw crusher using volume sources. The USAF characterized release heights and dimensions for the volumes in the same manner used in previous analyses.

The USAF also revised the emission rates that were used in the previous ambient analysis for the 450 horsepower diesel engines and the second deck of the screening plant

The volume source characterizations and emission rates are acceptable for this analysis.

RESULTS AND DISCUSSION

Table 1 shows the revised maximum ambient 24-hr PM-10 increment impacts from all increment consuming units at EAFB, including the jaw crusher.

Table 1 - Maximum 24 hour PM-10 Increment Impact

Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Class II Allowable Increment ($\mu\text{g}/\text{m}^3$)
22.80	30.0

CONCLUSION

The conclusions and recommended permit conditions listed in the December 4, 2006 memorandum are still valid. Please see that memorandum for details.

The Department has developed a new condition in the air quality control minor permit to ensure compliance with the ambient air quality increments. This condition is summarized below:

1. Apply wet suppression methods to the crushing and grinding circuit of the jaw crusher.

PED\slb

Appendix B : Technical Analysis Report for Permit No. AQ0264MSS01

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Air Permits Program

TECHNICAL ANALYSIS REPORT

for

Air Quality Control Minor Permit No. AQ0264MSS01

US Air Force

Eielson Air Force Base

PORTABLE ASPHALT/ROCK CRUSHER

Preparer: Sally A. Ryan, P.E.

Supervisor: Bill Walker

Date: Final – February 14, 2007

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Abbreviations/Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AQC	Air Quality Control
AS	Alaska Statutes
ASTM	American Society of Testing and Materials
COMs	Continuous Emission Monitoring System
C.F.R.	Code of Federal Regulations
EAFB	Eielson Air Force Base
EPA	U.S. Environmental Protection Agency
MR&R	Monitoring, Recordkeeping, and Reporting
N/A	Not Applicable
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NSPS	New Source Performance Standards
ORL	Owner Requested Limit
PS	Performance Standard
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
TAR	Technical Analysis Report
TBD	To Be Determined
USAF	United States Air Force

Units and Measures

bhp	brake horsepower or boiler horsepower
gr./dscf	grains per dry standard cubic feet (1 pound = 7,000 grains)
dscf	dry standard cubic foot
gph	gallons per hour
hp	horsepower
kW	kiloWatts (electric)
lbs	pounds
mmBtu	million British thermal units
ppm	parts per million
ppmv	parts per million by volume
ppmw	parts per million by weight
tph	tons per hour
tpy	tons per year
wt%	weight percent

Pollutants

CO	Carbon Monoxide
HAPS	Hazardous Air Pollutants
H ₂ S	Hydrogen Sulfide
NO _x	Oxides of Nitrogen
NO ₂	Nitrogen Dioxide
NO	Nitric Oxide
PM	Particulate Matter
PM-10	Particulate Matter with an aerodynamic diameter less than 10 microns
S	Sulfur
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound

1. Introduction

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Air Quality Control (AQC) Minor Permit No. AQ0264MSS01 to the United States Air Force (USAF) for a project at Eielson Air Force Base (EAFB). The USAF's minor permit application is dated March 2006; however the Department did not receive payment until June 5, 2006. The USAF submitted supplemental information on October 6, 2006, October 13, 2006, and October 30, 2006. USAF is planning to install a portable asphalt/rock crusher at EAFB.

2. Background

1.1 Current Permits

Not including Minor Permit No. AQ0264MSS01, USAF is currently operating EAFB under the following active AQC permits:

- Construction Permit 9831-AC019, issued December 10, 1998;
- Construction Permit No. 264CP02, issued May 13, 2002;
- Operating Permit No. 264TVP01, issued September 2, 2003;
- Construction Permit No. 264CP03, issued March, 4, 2004; and
- Construction Permit No. 264CP04, issued June 8, 2004.

Initial Operating Permit No. 264TVP01 issued September 2, 2003 contains the terms and conditions of Permit No.'s 9831-AC019 and 254CP02. The initial operating permit does not contain the terms and conditions of Permit No.'s 264CP03 or 264CP04.

1.2 Stationary Source Description

As described in the statement of basis for Permit No. 264TVP01, EAFB is a military installation located approximately 23 miles southeast of Fairbanks, Alaska. The base provides for forward air control for joint USAF and US Army contingencies in overall Alaska military installations, and in support of the USAF Pacific Air Forces. The 354th fighter wing has been the host of the military unit of the base since 1993.

EAFB hosts and supports a wide variety of functions and activities not normally associated with an industrial site. EAFB consists of an operational airfield, residential housing, office buildings, gas stations, utilities, military police and fire departments, public schools, chapels, hospital facilities, retail stores, recreational facilities, and more.

Sources of air pollution at the base are predominantly associated with primary or backup heating or power generation. At the base, six large coal-fired boilers and associated steam and generating equipment provide the primary heating or power generation; and distillate-fired boilers and generators provide backup heating and power. Other significant sources of air pollution include jet engine testing and diesel fuel-fired engines and water pumps.

The entire inventory of emission units at the base is provided in Table 1 of Permit No. 264TVP01.

EAFB is classified as a Prevention of Significant Deterioration- (PSD-) major stationary source for the following pollutants: oxides of nitrogen (NO_x), sulfur dioxide (SO₂), particulate matter (PM-10), and carbon monoxide (CO).

1.3 Application Description

USAF has requested authorization to install an asphalt/rock crusher at the base. They will use the plant to crush stockpiled asphalt pavement from various paving projects at the base over the last few years. USAF can use the crushed asphalt as road base, or gravel; or can melt the crushed asphalt and incorporate it into new asphalt pavement. The crusher will also crush gravel at other locations at EAFB.

The asphalt/rock crusher will consist of a horizontal shaft impact crushing plant, one conveyor, a screening plant, and radial stacking conveyor. The asphalt recycling plant will be powered by a 450 horsepower (hp) engine and a 100 hp diesel engine.³

The minor permit emission unit inventory is shown in Table 1 of Minor Permit No. AQ0264MSS01.

The USAF has requested an owner requested limit (ORL) of 2,184,000 horsepower-hours per year (hp-hr/yr)⁴ for the two new engines, combined, for the purpose of avoiding classification of this project as a PSD-significant modification for NO_x.⁵

For ambient air quality protection, the USAF requested restrictions on the location of the crusher that prohibit the crusher from being operated within 400 feet of any occupied building that can be accessed by the general public⁶ or within 1,000 feet of a building used for residential purposes or temporary lodging purposes. The USAF proposes to erect signs at locations that are 400 feet or farther away from the crusher while operating, indicating that only personnel that are either operating the crusher or supporting the operation of the crusher can process beyond the signs.

The March 2006 application lists three possible locations for the crusher: the asphalt recycle pile, Mullins Pit, and Cathers Lake. As described in the application these three locations comply with the location limitations. In addition, the USAF will also occasionally move the crusher to Blair Lakes Range Support Facility to crush gravel. The USAF intends to submit a separate permit application to cover activity at Blair Lakes.

In an application supplement dated October 6, 2006, the USAF revised the location of the rock crusher location when it is near the asphalt pile.

This is a portable crusher. However, the USAF has indicated that they want the option of leaving this crusher in one place for longer than 12 consecutive months. Therefore, even though the crusher is portable, they do not want the engines treated as non-road engines.

³ The project description in the application indicates the second engine is 95 hp, the emissions calculations in Appendix A of the application indicate 96 hp, and the vendor data in Appendix D of the application indicates 100 hp (for the Deutz BF4 M 2012 model engine). Because the USAF used the fuel rate for the Deutz BF 4 M 2012 engines, the Department has assumed that this is the desired engine, and will identify the unit accordingly.

⁴ In this TAR, the units “per year” mean “per 12 consecutive month period”.

⁵ The application indicates that the USAF wants the 2,184,000 hp-hr limit for the new engines. Item 3 of the cover letter for the application requests a revision to condition 15 of Construction Permit No. 264CP02 to include the new engines. In a telephone conversation dated August 25, 2006, Chris Menefee (Hoefler Consulting) confirmed that the cover letter is incorrect, and that USAF wants a separate limit for the two new engines..

⁶ The permit clarifies that “general public” includes families and guests of base personnel.

The USAF requested that the Department incorporate the minor permit into the operating permit as an administrative amendment.

The Departments' findings regarding the application are listed in Section 0.

1.4 Project Emissions Summary

In their application as revised through October 30, 2006, the USAF provided emission calculations for the new engines. The USAF used the following assumptions in their emission calculations. This list also indicates if the Department revised an assumption and provides an explanation for the revision.

- (1) **Units 62 through 74** (the rock crusher)⁷ unlimited operations.⁸ These units are fugitive dust sources.⁹ The Department does not count fugitives as part of potential to emit, therefore they are included under 18 AAC 50.502(c)(1) or (c)(3)(A). (The Department does count fugitives under 18 AAC 50.502(c)(3)(B) and (e)(2)). The USAF assumed "wet suppression" methods will be used to control PM-10, therefore used the "controlled" emission factors from AP-42, Table 11-19.2-2.
- (2) NO_x, PM-10, CO, and VOC emission factors for **Units 75 and 76** (the engines)¹⁰ are from AP-42 Table 3.3-1, dated 10/96.¹¹
- (3) **Units 75 and 76** have a group limit of 2,184,000 hp-hr/yr. The Department notes that because this is a group limit, the USAF could preferentially use one engine over the other. In this case, this does not matter for NO_x, PM-10, CO or VOC, because the emissions factors are the same for both engines.
- (4) SO₂ emissions for **Units 75 and 76** based on mass balance calculations, assuming 7.05 lb fuel per gallon, fuel with 0.50 wt%S, and **maximum** fuel rates (gal/hr) based on vendor data. The Department notes that because this is a group limit, the USAF could preferentially use one engine over the other. The Department re-calculated the worst case emissions by

⁷ The March, 2006 application lists the fugitive dust sources as ID's 1 through 11. An application supplement lists two additional fugitive sources as IDs 12 and 13. The Department refers to the fugitive sources as Unit No. 62 through 72 in this TAR and in Minor Permit No. AQ0264MSS01, in order to coordinate with the unit numbers listed in Title V Permit No. 264TVP01.

⁸ Although the diesel engines are limited to 2,184,000 hp-hr/yr, the USAF requested that the crusher not be limited, as they can use electrical power from the grid for additional crusher operation.

⁹ As defined in 40 C.F.R. 51.166(b), *Fugitive Emissions* means "those emissions which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening." In a February 10, 1999 EPA Guidance, EPA states: "where emissions are not actually collected at a particular site, the question of whether the emissions are fugitive or non-fugitive should be based on a factual, case-by-case determination made by the permitting authority". The Department is aware of cases where the rock crusher is enclosed, and emissions are routed through a baghouse thus indicating it is possible (at least under some circumstances). However, this particular rock crusher is (1) large, with a conveyor length of 50 ft, and a raised height of 18 ft, and (2) designed to be portable. The Department finds it is not reasonable to enclose this particular rock crusher in a building, therefore the emissions from the crusher and screens are fugitive in this case, as well as emissions from all transfer points.

¹⁰ The March, 2006 application lists the engines as IDs 12 and 13. These IDs are superseded. This TAR and Permit No. AQ0264MSS01 refers to these units as Unit 75 and 76.

¹¹ The March 2006 application included vendor data for Unit 75 (the Deutz BF-4-M-2012 engine) for NO_x, PM-10, CO, and VOC, based on "8 Mode Cycle Results". The vendor data is all lower than the AP-42 data. The Department was unable to conclude that the vendor data is appropriate for stationary source engines so did not recalculate, as the AP-42 data is more conservative.

assuming the entire limit used by **Unit 75** (the John Deere engine). This made a very slight difference in the SO₂ emissions estimate provided in the application.

Potential emissions from the units authorized by this minor permit are shown in Table 1.

Table 1 –Emission Estimates for Permit Applicability

Unit No.	Description	Potential Emissions in tpy				
		NO _x	CO	PM-10	VOC	SO ₂
62	Feed Hopper	N/A ^a	N/A	0.0	N/A	N/A
63	Cobra 1000 recycling plant	N/A	N/A	0.4	N/A	N/A
64	Transfer Point (recycle plant to Superior stackable conveyor)	N/A	N/A	0.0	N/A	N/A
65	Transfer Point (Superior stackable conveyor to 683 Hydrascreen)	N/A	N/A	0.0	N/A	N/A
66	Findlay 683 Hydrascreen	N/A	N/A	0.5	N/A	N/A
67	Transfer Point (683 Hydra to oversize return conveyor belt)	N/A	N/A	0.0	N/A	N/A
68	683 Hydrascreen fines screen	N/A	N/A	0.0	N/A	N/A
69	Transfer Point (fines screen to fines belt)	N/A	N/A	0.0	N/A	N/A
70	683 Hydrascreen fines screen	N/A	N/A	1.0	N/A	N/A
71	Transfer Point (fines belt to Superior radial stacking conveyor)	N/A	N/A	0.0	N/A	N/A
72	Transfer Point (fines belt to Superior radial stacking conveyor)	N/A	N/A	0.0	N/A	N/A
73	Feed from Truck to Feed Hopper	N/A	N/A	0.0	N/A	N/A
74	Transfer Point (Conveyor Discharge onto Asphalt Pile)	N/A	N/A	0.0	N/A	N/A
75	Recycle Plant Engine	33.9	7.3	2.4	2.7	4.0
76	683 Hydrascreen Engine					
Total Potential Emissions – Minor Permit Applicability		33.9	7.3	2.4	2.7	4.0
Minor Permit Applicability Threshold		10	N/A	10	N/A	10
Minor Permit Required?		Yes	No	No	No	No
Total Potential Emissions – PSD Permit Applicability		33.9	7.3	2.4	2.7	4.0
PSD Significant Modification Threshold		40	100	15	40	40
PSD Permit Required?		No	No	No	No	No

^a N/A means “Not Applicable”

Assessable emissions are shown in Table 2. The table shows the assessable emissions listed in Permit No. 264TVP01 issued September 2, 2003, and the **additional** assessable emissions from this minor permit. (It does not reflect any increases in assessable emissions that the Department may have authorized in Permit No.'s 264CP03 and 264CP04.)

Table 2 –Assessable Emissions

Pollutant	Assessable Emission listed in Permit No. 264TVP01 (tpy)	Emissions Increase due to Permit No. AQ0264MSS01 (tpy)	New Assessable Emissions (tpy)
NO _x	1,717	33.9	1,751
CO	755	7.3	962
PM-10	455	4.3	459
VOC	95	2.7	98
SO ₂	1,019	4.0	1,023
Total			4,293

3. Department Findings

Based on a review of the application, the Department finds that:

- (1) EAFB is classified as a PSD major stationary source for the following pollutants: NO_x, SO₂, PM-10, and CO.
- (2) The USAF has requested authorization to construct an asphalt/rock crusher at EAFB.
- (3) The project is classified as needing a permit under 18 AAC 502(b)(3) to construct, operate, or relocate a rock crusher with a rated capacity of at least five tons per hour of untreated material.
- (4) The project causes an increase in NOX potential to emit (PTE) over 10 tons per year (tpy), as shown in Table 1. Therefore this action requires a minor permit under 18 AAC 50.502(c)(3) for NOX.
- (5) The application includes an ORL of 2,184,000 hp-hrs/yr, to avoid classification of the project as a PSD significant modification for NOX. With this limit, the increases in PTE for regulated pollutants are below the thresholds for a PSD significant modification, as shown in Table 1. This ORL is a request to revise or rescind an existing Title I condition under 18 AAC 50.508(6). (Permit No. 264CP02, condition 15, contains limits to avoid classification as a NOX PSD significant modification, by limiting annual hours of operation for various emission units. Although the existing limits in Permit No. 264CP02 apply to different equipment than the current ORL, and will remain unchanged, this current request is added to the existing limits and is considered a “revision”.)
- (6) As described in 18 AAC 50.540(c)(2), an application for a minor permit classified under 18 AAC 50.502 must include a demonstration showing that the proposed increase in PTE

will not interfere with the attainment or maintenance of the ambient air quality standards. This permit contains location restriction as least as strict as General Permit 9 (GP9). The location restriction in GP9 are protective of ambient standards, therefore the USAF did not need to submit an ambient impact analysis to show compliance with the NOX ambient air quality standards with this application. The Department has incorporated all applicable requirements of GP9 into Minor Permit No. AQ0264MSS01.

- (7) Under 18 AAC 50.540(k), an application for a permit classified under 18 AAC 50.508(6) must include the effect of the change on “other permit terms”. The change authorized by Minor Permit No. AQ0264MSS01 does not affect any ambient air quality requirements at EAFB, so no modeling is required under 18 AAC 50.540(k).
- (8) As described in the modeling memorandum attached as Appendix A, the Department requested under 18 AAC 50.201(b) that the USAF conduct modeling to show that the rock crusher would not cause a violation of the PM-10 increment.¹² The USAF submitted this modeling to the Department on October 30, 2006. After review of the modeling analysis, the Department determined that with the GP9 restrictions, the rock crusher will not cause a violation of the maximum allowable 24-hour PM-10 increment.
- (9) The crusher and the diesel engines are subject to state emissions standards in 18 AAC 50.055(a) (1) for visible emissions, 18 AAC 50.055(b)(1) for PM emissions, and 18 AAC 50.055(c) for SO₂ emissions, for industrial processes and fuel burning equipment.
- (10) The application indicates three possible locations at EAFB that comply with permit requirements. The permit includes authorizations to operate at the asphalt pile, Mullins Pit, and Cathers Lake.
- (11) As requested, the Department has treated the diesel engines as stationary engines.
- (12) In the cover letter, USAF requested that the Department incorporate the provisions of Minor Permit No. AQ0264MSS01 into Operating Permit No. 264TVP01 by administrative amendment. It is not necessary to amend the title V permit, because The Department considers the Title I permit changes made by the minor permit to be off permit changes for the purposes of Title V permitting. (The USAF is not requesting a change to condition 15 of Permit 264CP02, which had been incorporated into the Title V permit. See footnote 5.) Subsequently, the USAF has revoked its request to incorporate the minor permit into the operating permit as an administrative amendment.¹³
- (13) EAFB is not in a coastal district, so no Alaska Coastal Management Program coordination is required for this project.
- (14) The USAF’s application and subsequent submittals for a minor permit contain the elements listed in 18 AAC 50.540.

¹² EAFB is a stationary source with other increment consuming emission units (besides the rock crusher). The Department has already made a finding under 18 AAC 50.201(b) through the GP9 permit that uncontrolled rock crushers may cause increment violations. The location restriction in GP9 do not necessarily protect increment at stationary sources with other increment consuming emission units.

¹³ Telephone conversation between Chris Menefee (Hoefler) and Sally Ryan (Department) November 28, 2006, and confirmed by Zachary Mothershed (USAF) by email on November 28, 2006.

4. Permit Requirements

State regulations in 18 AAC 50.544 describe the elements that the Department must include in minor permits. This section of the TAR provides the technical and regulatory basis for the permit requirements in Minor Permit No. AQ0264MSS01, which is classified under **18 AAC 502(b)(3)**, **18 AAC 50.502(c)(3)**, and **18 AAC 508(6)**. The permit includes the following minor permit requirements described in 18 AAC 50.502:

- (1) The cover page identifies the stationary source, the project, the permittee, and contact information. This information is required for each minor permit issued under 18 AAC 50.542, as described in 18 AAC 50.544(a).
- (2) Emission fee requirements are required for each minor permit issued under 18 AAC 50.542, as described in 18 AAC 50.544(a). The Department includes emission fee requirements in minor permits if the minor permit changes assessable emissions. New assessable emissions are shown in Table 2.
- (3) As described in 18 AAC 50.544(c)(2), a minor permit classified under 18 AAC 50.502(c) must include performance tests for emission limits under 18 AAC 50.055 (state emission standards).

In general, the Department modeled this permit after GP9, for rock crushers. Following are the bases for specific permit requirements.

4.1 Emission Unit-Specific Requirements

4.1.1 State Emission Standards for Asphalt/Rock Crushers

Visible Emissions – The application did not include a visible emissions compliance demonstration for the asphalt/rock crusher, so the Department included this requirement in the permit. Because a rock crusher has the potential to violate the visible emissions standard, the Department also included on-going visible emissions observations requirements in the permit.

Particulate Matter - The application did not include a PM compliance demonstration for the transfer points of asphalt/rock crusher. The Department did not add an initial performance test for PM in the permit because it is not possible to perform Method 5 when the emissions are not emitted from a stack, vent, or duct.

Sulfur Dioxide – The transfer points of the asphalt/rock crusher do not emit SO₂, so there is no need for the Department to include an initial performance test or on-going monitoring, recordkeeping, and reporting (MR&R) in the permit.

4.1.2 State Emission Standards for Diesel Engines

Visible Emissions – The applicant did not include a visible emissions compliance demonstration for the diesel engines in the application, so the Department included this requirement in the permit. The visible emission condition also contains on-going MR&R as described in the standard condition for liquid fuel-fired emission units.

Particulate Matter - The application included a PM compliance demonstrations for Units 75 and 76. For Unit 75 (450 hp) in Table B-2.

The USAF compliance demonstration for Unit 75 is based on a vendor data sheet indicating that the engine complies with TIER 2 EMISSIONS CERTIFICATIONS: CARB, EPA; AND EU. However, a manufacturer shows compliance with the Tier 2 nonroad engine PM emission factor based on a variable load cycle. Absent documentation, the Department cannot be assured that the cycle used to show compliance with the Tier 2 standard is representative of an engine used to power a rock crusher. Because it is a weighted average of emission rates at different loads, it certainly does not represent “worst case”. Further, the calculated grain loading is at 80 percent of the state standard, which does not provide much margin for compliance with the state PM standard. Therefore the Department included a requirement to provide a vendor guarantee or to perform an initial compliance test for Unit 75 at loads representative of actual operations.

USAF used vendor data for Unit 76 (100 hp). As described in footnote 11, this data is based on “8 Mode Cycle Results” and, as with Unit 75, the Department is unable to conclude that it is appropriate for this engine. However, due to its small size, the Department did not include an initial compliance demonstration for this unit.

On-going MR&R for both units is based on the standard condition for liquid fuel-fired emission units.

Sulfur Dioxide – Compliance with the state sulfur standard is based on the standard condition for liquid fuel-fired emission units.

4.1.3 PSD Significant Modification Avoidance Requirements for NO_x

The permit contains an ORL of 2,184,000 hp-hrs/ for Units 75 and 76, combined, to avoid classification of the project as a PSD significant modification for NO_x. With this limit, the increases in the NO_x PTE is 33.6 tpy, which is about 84 percent of the 40 tpy threshold for a PSD significant modification.

The NO_x emissions for Unit 75 and 76 are based on AP-42 emission factors (as described in section 2.2, item (2)), however, because the ORL results in a limit well below the threshold, it is not necessary to require more stringent monitoring, recordkeeping, and reporting.

4.1.4 Ambient Air Quality Protection Requirements

This permit lists the applicable location restrictions in GP9 for protection of ambient air quality standards and increments. Because the Department has previously determined that a crusher operating under GP9 will not violate ambient air quality standards, the USAF did not need to submit a demonstration showing compliance with ambient air quality standards with this application. However, compliance with GP9 does not ensure compliance with the maximum allowable increment because of the high background of increment consuming emissions at EAFB. The USAF submitted a demonstration of compliance with the 24-hr PM-10 increment. The Department concurred with USAF’s conclusion that no additional (in addition to GP9 requirements) are necessary to ensure compliance with the maximum allowable increment. The Department’s review of the modeling demonstration is included in Appendix A. Based on public comment, the Department has updated Bullet (2)a.i under Conclusions in the modeling memo to read “within 400 feet of any occupied building **that can be accessed by the general public**”. In this permit the “general public” includes families and guests of base personnel.

In addition, in calculating the PM emission rate from the crushing operations for the modeling analysis, the USAF used “controlled” emission factors from Table 11.19.2-2. AP-42, Table 2-2 indicates that the “controlled” emission factors are based on “wet suppression”. The Department has included a permit condition requiring the USAF to maintain at least 0.6 percent moisture in the material being crushed. This is based on AP-42, Table 11.19.2-2, footnote b, which indicates that the “controlled” emission factors are for material with 0.55 to 2.88 percent moisture. The footnote also indicates that visual observations are the “best indicator” that the “controlled” emission factor is the appropriate for estimating emissions.

4.1.5 Maintenance Requirements

As described in 18 AAC 50.544(b)(2), the permit must include maintenance of equipment according to the manufacturer’s or operator’s maintenance procedures, keep records, and keep a copy of the maintenance procedures.

4.2 Stationary Source-Wide Requirements

This section includes fugitive dust, dust control plan, and air pollution prohibited requirements from GP9. These requirements are necessary to ensure that the project complies with the requirements of AS 46.14 and 18 AAC 50, as described in 18 AAC 50.544(b)(1).

4.3 Recordkeeping, Reporting, and Certification Requirements

All air quality control permits must contain procedures for recordkeeping, reporting, and certification.

Information request and certification requirements are specifically required under 18 AAC 50.200 and 18 AAC 50.205, respectively.

4.4 Terms to Make Permit Enforceable

The minor permit contains these requirements to ensure that the permittee will construct and operate the stationary source or modification in accordance with 18 AAC 50, as described in 18 AAC 50.544(i).

5. Permit Administration

The Department considers the addition of the Rock Crusher as authorized in the minor permit to be an *off-permit change* for the purposes of Title V permitting. *Off-permit changes* are defined in 40 C.F.R. 71.6(a)(12) as

”...changes that are not addressed or prohibited by the permit other than those subject to the requirements of 40 C.F.R. parts 72 through 78 or those that are modifications under any provision of title I of the Act...”

Therefore, the USAF may operate in accordance with Minor Permit No. AQ0264MSS01 upon issuance.

Appendix A

Modeling Review Memorandum

MEMORANDUM

State of Alaska
Department of Environmental Conservation
Division of Air Quality

TO:	File	DATE:	December 4, 2006
THRU:	Alan E. Schuler, P.E.	FILE NO.:	AQ0264MSS01 –
Modeling	Environmental Engineer		Eielson AFB, Rock Crusher
FROM:	Sally A. Ryan, P.E.	PHONE:	269-6271
	Environmental Engineer	FAX:	269-7508
SUBJECT: Review of Ambient Assessment			

The United States Air Force (USAF) submitted an application dated March, 2006 for a rock crusher at Eielson Air Force Base (EAFB). Hoefler Consulting Group (Hoefler) (on behalf of the USAF) submitted modeling in support of the application on October 6, 2006. The USAF submitted revised modeling on October 30, 2006. This memorandum summarizes the Alaska Department of Environmental Conservation's (Department's) findings regarding the **October 30, 2006** assessment.

The revised analysis adequately shows that the permit revision will not cause or contribute to a violation of the 24 hour PM-10 increment provided in 18 AAC 50.020.

BACKGROUND

The Department made a finding previously that rock crushers with no central collection system have the potential to violate ambient standards and maximum allowable increment consumption. Therefore, in 2003, the Department did modeling under 18 AAC 50.201(b) to predict the ambient impacts of rock crushers. The Department used the modeling results to establish permit conditions in General Permit 9 (GP9) to protect ambient standards and increments for rock crushers. Note that, in the rock crusher modeling analysis, the Department found that the 24-hr PM-10 Alaska Ambient Air Quality Standard (AAAQS) and increment were the controlling standards.

PROJECT CLASSIFICATIONS

The project to install and operate a rock crusher at EAFB is classified as needing a permit under 18 AAC 50.502(b)(3) to construct, operate, or relocate a rock crusher with a rated capacity of at least five tons per hour of untreated material. It is classified under 18 AAC 50.502(c)(3) because it causes an increase in NO_x PTE over 10 tpy. The project is also classified under 18 AAC 50.508(6) to revise or rescind an existing Title I condition.

As described in 18 AAC 50.540(c)(2), an application for a minor permit classified under 18 AAC 50.502 must include a demonstration showing that the proposed increase in PTE will not interfere with the attainment or maintenance of the ambient air quality **standards**. In their application, the USAF requested restrictions on the location of the crusher that are at least as strict as the restrictions in GP9 for ambient air quality protection (i.e. prohibit the crusher from

being operated within 400 feet of any occupied building or within 1,000 feet of a building used for residential purposes or temporary lodging purposes). The location restrictions in GP9 are protective of ambient standards (and increments as well, unless the rock crusher is located at an existing stationary source with other increment consuming emission units); therefore, the USAF did not need to submit an ambient impact analysis to show compliance with the **NO_x ambient air quality standards** with this application.

Under 18 AAC 50.540(k), an application for a permit classified under 18 AAC 508(6) must include the effect of the change on other permit terms. The change authorized by Minor Permit No. AQ0264MSS01 does not affect any ambient air quality requirements at EAFB, so no modeling is required under 18 AAC 50.540(k).

EAFB is an existing stationary source. EAFB has adequately demonstrated compliance with PM-10 AAAQS by adding the GP9 impacts to the previously modeled EAFB impacts. EAFB was not able to demonstrate compliance with the increment using this approach. Because the Department has already made a finding under 18 AAC 50.201(b) through the GP9 permit that uncontrolled rock crushers may cause increment violations, and the location restrictions in GP9 do not necessarily protect increment for rock crushers located at stationary sources with other increment consuming emission units, the Department requested under 18 AAC 50.201(b) that the USAF conduct modeling to show that the rock crusher would not cause a violation of the PM-10 increment. The USAF submitted this modeling to the Department on October 6, 2006. However, the modeling submitted on October 6, 2006 was inadequate. First, it showed a violation of the allowable increment, because the receptor grid used by the USAF inappropriately included receptors inside the EAFB flight line. Second, the USAF was unable to document a revised exhaust temperature used to characterize the Hush House. At the Departments request, the USAF corrected the inadequacies and submitted a revised ambient analysis on October 30, 2006.

APPROACH

The USAF used EPA's *Industrial Source Complex Short-Term* (ISCST3) dispersion model version 02035 to predict the ambient 24-hour PM-10 increment impacts. They based the modeling analysis on modeling conducted in 2003, including the meteorological data used previously. This is an appropriate approach for this analysis.

As described in the application, the only changes USAF made to the 2003 modeling analysis are as follows:

- (1) The USAF added the recycle plant engine and the 683 Hydrascreen Engine to the modeling analysis as point sources. (These are identified as **Model IDs 14 and 15** in the modeling analysis, and as **Units 75 and 76** in Permit No. AQ0264MSS01.)¹⁴
- (2) The USAF added the feed hopper, Cobra 1000 Recycling Plant, Transfer Point (Recycle Plant to Superior Stackable conveyor), Transfer Point (Superior Stackable conveyor to 683 Hydrascreen), Findlay 683 Hydrascreen, Transfer Point (683 Hydrascreen to oversize return conveyor belt), Transfer Point (oversize conveyor belt return to Cobra 1000 Recycle Plant), Transfer Point (oversize conveyor belt return to Cobra 1000 Recycle Plant), Transfer Point (683 Hydrascreen to second deck oversize return conveyor belt), 683 Hydrascreen fines screen, Transfer Point (fines screen to fines belt), Transfer Point

¹⁴ The Department notes that the March 2006 application is missing some of the volume sources modeled in the October 2006 ambient analysis. Therefore the IDs in the March 2006 application are superseded.

(fines belt to Superior radial stacking conveyor), Feed from truck to Feed Hopper, Transfer Point (conveyor discharge onto asphalt pile) to the modeling analysis as volume sources. (These are identified as **Model IDs 1 through 13** in the modeling analysis, and as **Units 62 through 74** in Permit No. AQ0264MSS01.)

- (3) The USAF revised the modeling inputs for the Hush House. (This is identified as **Model ID HUSHSE** in the modeling analysis; it is not part of the minor permit so is not included in the minor permit or minor permit application.) Because of recent Base Realignment and Closure decisions, the USAF is phasing out the A-10 Thunderbolt II aircraft at EAFB, and only the F-16 Fighting Falcons will remain. The 2003 modeling analysis used characteristics and emissions from the A-10.
- (4) Rather than the Cartesian receptor grid used in 2003, the USAF used a polar receptor grid with the origin at the asphalt plant and receptor rings at 1,000 ft, 1,250, and 1,500 ft for this analysis to better match the modeling approach used in GP9. There are no receptors on the 1,250 ft ring from directions 150 degrees through 200 degrees, and the 1,500 ft ring from 140 degrees through 210 degrees because these points are inside the flight line.

Since the Department approved the previous analysis, it is only necessary to review the changes.

Emission Rates and Stack Parameters

Point Sources:

The revised modeling parameters for the existing Hush House, and the modeling parameters for the new Recycle Plant Engine and the 684 Hydrascreen Engines are shown in the "Ambient Analysis Report" submitted to the Department on October 30, 2006.

Table 1 shows the revisions Hush House modeling parameters, relative to the 2003 analysis.

Table 1 – Changes to Hush House Modeling Parameters

	2003 (includes A-10 Thunderbolt I)	2006 (only the F-16 Fighting Falcons)
Exhaust Temperature (degrees Kelvin)	373	477.6 ^a
Exhaust Velocity (meters per second)	0.2	2.74

Table Notes

^a See October 24, 2006 email from Alan Schuler (Department) to Chris Menefee (HMH) concurring with Hush House exhaust temperature.

The Department concurs with the revisions.

The PM-10 emission rates for the new Recycle Plant Engine and the 684 Hydrascreen Engines are based on AP-42, Table 3.3-1. The emission rates and stack parameters for Unit 75 (recycle plant engine) are appropriate for this analysis. The Department made a minor revision to the emission rate in g/s for the 683 Hydrascreen as follows, to reflect vendor data provided in the application.¹⁵

¹⁵ The project description in the application indicates the second engine is 95 hp, the emissions calculations in Appendix A of the application indicate 96 hp, and the vendor data in Appendix D of the application indicates 100

Given: Emission Rate in lb/hp-hr: 2.2×10^{-3} (AP-42, Table 3.3-1, dated 10/96)

Calculate emission rate in grams/second for a 100 hp engine:

$$\left(2.2 \times 10^{-3} \frac{\text{lb}}{\text{hp} - \text{hr}}\right) \left(453.5924 \frac{\text{g}}{\text{lb}}\right) (100 \text{ hp}) \left(1 \frac{\text{hr}}{3,600 \text{ sec}}\right) = 0.0277 \frac{\text{g}}{\text{s}}$$

The modeling parameters for the new volume sources associated with the rock crusher are shown in Table 2 of the ambient analysis submitted October 30, 2006. USAF's "Ambient Impact Analysis" indicates that the PM-10 emission rates are from AP-42 Table 11.19.2-2, assuming wet suppression. The emission rates are appropriate. The Department will include a requirement in the permit for "wet suppression" of these emitting units.

RESULTS AND DISCUSSION

Table 2 shows the maximum ambient 24-hr PM-10 increment impacts (using the revised emission rate for the 683 Hydrascreen engine), from all increment consuming units at EAFB, including the rock crusher.

Table 2 - Maximum 24 hour PM-10 Increment Impact

Maximum Modeled Concentration ($\mu\text{g}/\text{m}^3$)	Class II Allowable Increment ($\mu\text{g}/\text{m}^3$)
25.92	30.0

The maximum occurs in the 1,000 foot ring.

CONCLUSIONS

The Department concludes:

- (1) The USAF conducted the analysis in a manner consistent with EPA's *Guideline on Air Quality Models*.
- (2) With restrictions as follows, the installation of the rock crusher will not cause a violation of the maximum allowable increment.
 - a. Do not locate the rock crusher
 - i. within 400 feet of any occupied building;
 - ii. within 1,000 feet of a building used for residential or temporary lodging purposes; or
 - iii. within 1,000 ft of any access road that constitutes ambient air.
 - b. Apply wet suppression methods to the asphalt prior to crushing operations.

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hp (for the Deutz BF4 M 2012 model engine). Because the USAF used the fuel rate for the Duetz BF 4 M 2012 engines, the Department has assumed that this is the desired engine, and will identify the unit accordingly.

